Lilly HOSPITAL PHARMACY SURVEY 1985

B5165-3-U

A COMPREHENSIVE REVIEW

A survey of the 1984 operations of
1964 hospital pharmacies
provided to hospital pharmacy directors
in the interest of sound management

Eli Lilly and Company
Pharmaceutical Division
General Offices and Principal Laboratories
Indianapolis, Indiana 46285

Editor
Carl H. Deiner, R.Ph.
Art Editor
Charles G. Russell
Technical Assistance
Grace E. Witte
Elma B. Carter
Robert L. Seay

Copyright 1985, Eli Lilly and Company

FOREWORD

The 1985 edition of the LILLY HOSPITAL PHARMACY SURVEY presents data in tabulations similar to those found in previous issues. In addition, however, the content of the SURVEY has been expanded to provide information contributed by authors outside of Eli Lilly and Company concerning issues that are timely and somewhat controversial, including a five-year forecast of hospital pharmacy operations.

Overall, several streamlining changes have been implemented in response to pharmacists' suggestions. These include:

- A more concise compilation of key operating statistics that should make it easier for pharmacy management to find comparative data quickly.
- A presentation of the concept of productivity measurement of pharmacy personnel as well as a work sheet to calculate pharmacy productivity.

The data collection procedure for the SURVEY was similar to that used in previous years. The SURVEY represents the averages of the data reported from actual operations and does not attempt to define or structure the sample.

It should be noted that, because not all hospital pharmacies responded to every question, some of the charts and tables are based on data from fewer than the total number which participated. In some tabulations, sample sizes were insufficient, usually because the hospital population did not contain sufficient numbers, and these are designated as "n/a" (not available).

Eli Lilly and Company is delighted to provide this publication to all who are interested in hospital pharmacy practice. It is hoped that the SURVEY will prove helpful to hospital pharmacy managers in the analysis of their department's operation and their formulation of future plans.

TABLE OF CONTENTS

Foreword

2 ***Executive Summary***

An overview of current trends in hospital pharmacy operations

4 ***Market Factors***

A discussion of selected issues having an impact on hospital pharmacy operations and some insight into several challenges facing hospital pharmacy managers

8 ***Inventory and Purchases***

A tabulation of inventory and purchases statistics according to hospital bed size and profile together with commentary on the variations among hospital pharmacies

11 ***Pharmacy Staff Compensation***

A discussion of the average annual pay for each pharmacy department staff component

12 ***Geographic Summary***

A regional breakdown of selected operating data with commentary on variations among regions

13 ***Pharmacy Services***

Routinely offered pharmacy services ranked according to the percentage of total mentions along with a discussion of changing trends

14 ***Pharmacy Operations Management***

Key operating statistics presented according to hospital profile and bed capacity. Data selection was based on those elements indicated by managers as being most relevant to effective hospital pharmacy practice

16 ***Productivity Measurement***

A discussion of pharmacy department productivity and a tabulation of productivity indicators arranged by hospital size and profile

18 ***Operating Trends and Outlook***

A medium-term forecast of hospital pharmacy operating statistics and a discussion of the elements that were considered in preparing the forecast

21 ***Comparative Analysis Work Sheet***

22 ***Productivity Work Sheet***

23 ***Conclusion***

EXECUTIVE SUMMARY

Selected operating data from 1964 hospital pharmacies are shown in Table 1. These reflect a composite profile of the "average" hospital pharmacy in the United States for the operating year 1984. Since this hypothetical hospital pharmacy is derived mathematically from a broad range of information, the figures may be too general to permit direct comparison with those of an individual operation. However, trends can be observed by comparing the figures with similar statistics published in previous issues of the LILLY HOSPITAL PHARMACY SURVEY.

Table 1 shows that the average hospital in 1984 had 245 beds—this number is essentially unchanged from that of 1983 and is the same as the number reported for 1982. Of particular note is the dramatic decline in census (from 69 percent in 1983 to 63 percent in 1984). Census has fallen consistently since 1982, when it was 71 percent. Admissions during 1984 were 2 percent lower than in the previous year.

The average length of hospital stay declined from 7.1 days last year to 6.6 days in 1984 (a decrease of one-half day), the shortest period of patient stay ever recorded in the SURVEY. The largest segment of hospitals reporting to the SURVEY continues to be private, nonprofit, general institutions.

Both the number of hours the central pharmacy was open and the number of hours worked by pharmacists rose slightly during 1984, although technician and support personnel hours declined somewhat. Overall, the total hours worked per week by the staff remained virtually unchanged from the previous year. Three hours of pharmacist time were required for each hour the central pharmacy was open during 1984—slightly higher than the 2.9 reported last year. The ratio of hours worked by technicians to hours open was approximately the same as reported the previous year—2.7. Hours worked by support personnel for every hour open declined from 1.2 to 1.1 during 1984.

For the first time in SURVEY history, the dollar value of inventory in 1984 did not show an increase over the previous year's figure. However, purchases were over 7 percent higher, with the result that the estimated inventory turnover rate increased from 7.2 to 7.8 times. If the inventory turnover rate had remained at 7.2 times during 1984, inventory would have been about $10,000 higher than the 1983 figure. It should be noted that, on the basis of occupied beds, inventory and purchases figures were approximately 10 and 18 percent higher, respectively, than in 1983. The significant improvement in the inventory turnover rate observed over the past few years indicates that hospital pharmacy managers are continuing to succeed in their efforts to control inventory investment, which contributes to better cash flow in their institutions.

Comparison of inventory and purchases on the basis of patient days shows that inventory during 1984 equaled $2.16 per patient day—up 20 cents, or 10.2 percent higher than in the previous year. Purchases were $16.77 per patient day, an increase of 18.2 percent. Because inflation is not accounted for separately,

Table 1 *Average hospital pharmacy*

	1984 (1964 Hospitals)	1983 (2102 Hospitals)	Percent of Change
Bed capacity	245	246	(– 0.4%)
Class	Private nonprofit general	Private nonprofit general	
Census (beds occupied)	63%	69%	
Admissions	8582	8750	(– 2.0%)
Patient days	56,338	61,955	
Length of patient stay	6.6 days	7.1 days	
Hours central pharmacy open/week	97	96	+ 1.0%
Pharmacist hours/week	290 (7.3 FTE)	281 (7.0 FTE)	+ 3.2%
Technician hours/week	260 (6.5 FTE)	263 (6.6 FTE)	(– 1.2%)
Support personnel hours/week	109 (2.7 FTE)	116 (2.9 FTE)	(– 6.4%)
Inventory	$121,414	$121,552	(– 0.1%)
	$ 2.16/Patient day	$ 1.96/Patient day	+ 10.2%
	$ 496/Bed	$ 494/Bed	+ 0.4%
	$ 786/Occupied bed	$ 715/Occupied bed	+ 9.9%
	$14.15/Admission	$13.89/Admission	+ 1.9%
Purchases	$944,569	$879,431	+ 7.4%
	$16.77/Patient day	$14.19/Patient day	+ 18.2%
	$ 3855/Bed	$ 3575/Bed	+ 7.8%
	$ 6118/Occupied bed	$ 5181/Occupied bed	+ 18.1%
	$110.06/Admission	$100.51/Admission	+ 9.9%
Inventory turnover rate	7.8 times	7.2 times	
Floor area (central pharmacy)	1734 sq ft	1629 sq ft	
Services offered by over 60% of pharmacies:			
	Monitoring patient profiles	Monitoring patient profiles	
	Monitoring drug interactions	Monitoring drug interactions	
	Providing drug information services	Providing drug information services	
	Drug therapy consultation	Drug therapy consultation	

its influence on inventory and purchases cannot be isolated. Therefore, these figures do not necessarily reflect increased use of drugs and related items by hospital patients.

The size of the central pharmacy increased more than 100 square feet during 1984. One explanation for this may be the distribution of the overall sample toward larger-sized hospitals. Another may be that the continued expansion of unit-dose and parenteral admixture programs has increased the department's overall space requirements.

Among the ten services listed in the SURVEY, the ranking for the top four was the same for 1984 as for 1983. These four services were offered by over 60 percent of the hospital pharmacies that responded. It is interesting to note that pharmacokinetic service, although not ranked among the top four, showed the highest rate of growth—from 23.2 percent in 1983 to 27.7 percent in 1984. These data suggest that clinical services offered in reporting hospital pharmacies continue to expand.

A comparison of selected operating statistics over the nine years that the LILLY HOSPITAL PHARMACY SURVEY has been published reveals the following trends:

- Pharmacy hours open per week rose from 74 to 97, an increase of 31.1 percent.
- Pharmacist hours worked per week increased 90.8 percent, from 152 to 290, or approximately 10 percent each year.
- Although technician hours worked per week fluctuated from year to year, they trended upward from 129 to 260, a 101.6 percent increase, or about 11 percent each year.
- Inventory investment rose 76.9 percent, an annual growth rate of about 8 percent over the nine-year period. Inventory per occupied bed increased 118.3 percent, for an annual rate of over 13 percent.
- Purchases increased 190.3 percent during this period, for an annual growth rate of over 21 percent. Purchases per occupied bed went up 258.8 percent, reflecting an annual rate of 28.8 percent.

The distribution of SURVEY participants by bed size for 1984 is quite similar to that observed in earlier editions of the SURVEY. Institutions with fewer than 200 beds comprised 54.2 percent of the sample. A total of 369 hospitals with more than 400 beds is included and accounted for 18.8 percent of respondents—slightly higher than the 18.5 percent recorded for 1983. The distribution of the data for the 1985 LILLY HOSPITAL PHARMACY SURVEY is again weighted in favor of larger institutions. It should be noted that, according to hospital classification, private, nonprofit facilities again make up the largest reporting segment at 61.7 percent—up from last year's figure of 61.0 percent. Government (all but federal) institutions comprise 24.6 percent of the sample, down 1 percent from the 1983 figure. In terms of specialization, the largest percentage of pharmacies included in the 1985 LILLY HOSPITAL PHARMACY SURVEY is general hospitals—70.3 percent—about the same percentage as reported last year. Specialized facilities account for 19.6 percent of respondents (up from 19.0 percent for 1983).

Almost 93 percent of hospital pharmacy participants indicated that physicians could request a nonformulary item—virtually the same percentage as reported last year. A total of 146 (7.6 percent) have responsibility for central supply service. Of these, about four out of ten were involved with both the purchasing and administrative functions.

Only 116 (5.9 percent) of SURVEY respondents reported utilizing an outside management organization to operate the pharmacy. Of these respondents, about 90 percent were general hospitals and four were specialized institutions. Approximately one in three participants said that they offered accredited medical resident/intern training programs. Over 62 percent of federal facilities provided these programs, whereas four of ten private, nonprofit hospitals offered this type of instruction.

The pharmacy department's use of computers increased during 1984. Computerized patient billing was reported by over 54 percent of participants—up from about 51 percent recorded last year. Computer-generated formulary systems are in use in 35.2 percent of hospitals (up from 28.6 percent for 1983). The recording of patient-profile information was computerized in almost 29 percent of reporting hospitals—up over 6 percent from last year's figure.

With each succeeding edition of the SURVEY, the percentage of responding hospital pharmacies employing a full coverage (over 90 percent of beds served) unit-dose system as their primary means of drug distribution has continually increased so that during 1984 eight of ten now use this method. In addition, close to 70 percent (up from 65 percent last year) indicated that they provided full-coverage parenteral admixture service. A total of 877 general hospitals and 265 specialized facilities provided both unit-dose and parenteral admixture service to their total patient population (63.6 percent and 68.8 percent respectively).

Almost 90 percent of participants said that they dispense medication every 24 hours, whereas less than 10 percent issue drugs at intervals of more than 24 hours—about the same percentage as recorded the previous year. Over 93 percent of respondents purchase pharmaceuticals in unit-dose packaging whenever possible (up from 92.7 percent reported last year).

Among pharmacies reporting to the SURVEY, about one in five offers 24-hour pharmacy service. Of participating general hospitals, about 12 percent provide round-the-clock pharmacy service, whereas over 63 percent of specialized facilities do so. SURVEY data indicate that among all hospitals offering 24-hour pharmacy service, the pharmacist/technician ratio averages close to 1:0.8.

MARKET FACTORS

Factors Influencing Contemporary Institutional Practice

Kenneth W. Kirk, Ph.D.* and
James E. Smeeding, R.Ph.†

Health care delivery is changing at a phenomenal rate. The role of institutional pharmacy practitioners and the economies of organized health care are sure to evolve in this process. One way to measure change in these dynamic times is to examine the contemporary practice of hospital-based pharmacy practitioners.

Over the past 20 years, most aspects of hospital pharmacy practice have changed in some manner. Pharmacists and pharmacy staff personnel have entered areas that even the most forward-thinking practitioner of the 1960's would have found difficult to accept. In 1965, clinical pharmacy was a dream; unit dose was in its infancy; and IV admixtures were an insignificant part of even the most advanced practice setting. Today, these services are provided routinely in the majority of hospitals of every size and in every area of the country.

Standards of Hospital Pharmacy Practice

The Lilly Hospital Pharmacy Survey has tracked these advancements by measuring the growth of hospital practice on the basis of personnel, space, and other commodity consumption. Even a cursory view of these data indicates that the substantial expansion in hospital pharmacy matches that of all health care provided in the institutional setting. This growth has been facilitated by the American Society of Hospital Pharmacists, which has updated and upgraded the standards of institutional pharmacy practice.[1]

The basics of pharmacy services continue to focus around the purchase, distribution, and control of all pharmaceutical agents within an institution. However, recent additions include informational services provided to the medical staff and patients and quality assurance and patient monitoring efforts.

Drug Distribution and Control

Drug distribution and control systems have been the cornerstone of the hospital pharmacist's increased involvement as a health care practitioner. This responsibility has not changed in 20 years, nor is it likely to change in the next 20 years. However, the systems through which pharmacists are accomplishing these objectives have changed.

The formulary is the primary list of medications that are stocked within a hospital. It identifies those products selected by the pharmacy and medical staff. This basic tool is the initial focus of drug control. Today's pharmacist is involved more than ever before in managing this drug list. In many hospital pharmacies, this list is computerized and maintained by word-processing functions. The list may be sorted alphabetically, by therapeutic class, or by route of administration. In addition, the computer may contain pricing information that allows the physician to measure cost benefits of various prescribing alternatives. A part of this process has been the development of the pharmacist as a drug expert.

Investigational drug use as a part of drug control within the hospital setting today involves the pharmacy department. This involvement has greatly increased patient safety by decreasing medication errors. However, the strength of hospital pharmacy practice centers around inventory control, storage, labeling, and distribution.

Once drugs have been procured by an institution, the distribution system comes into play. In the 1960's, hospital pharmacists developed a system of drug distribution termed "unit dose," which involved the pharmacist in patient care. Over the years, this system has developed into an effective method of drug distribution and control. One major change has been the availability of unit-of-use packaging through manufacturers. This endorsement by the pharmaceutical industry has facilitated the pharmacist's commitment to this distribution system.

Satellite Pharmacies

With the unit-dose system in place, pharmacy departments began to look toward sophistication within this system. Some of the changes were born out of logistical problems, whereas others have been based on efforts to improve patient care. Perhaps the first move to improve patient care further and give the pharmacy more visibility within the hospital was the development of the satellite pharmacy. Funneling all patient orders into a central location, efficiently handling these orders, and redistributing medication can be a complicated task. Many hospitals began establishing miniature pharmacies located on or near the patient care unit to ease the complexity of medication preparation and delivery.

These satellites allowed for much more than just increased distribution efficiency. They also facilitated better communication between the pharmacist and the physician and nurse. This interaction enhanced the image of the pharmacist as a provider of information. This new opportunity also pointed out the need for a greater understanding of disease states and the role of pharmaceuticals in patient care. Clinical pharmacy practice and training, as we know it today, is a product of this interaction.

Not all hospitals have the space necessary to open satellite pharmacies. In the past ten years, we have seen decentralized services being provided by pharmacist-operated mobile units.

Pharmacists, aided by a medication cart, make rounds to the nursing units to dispense medication orders. Medication orders can be filled soon after they are written, and long waiting periods associated with a centralized system can be eliminated.

Supportive Personnel and Changing Technology

As the demands of drug distribution and patient care gained a larger share of the pharmacist's time, the role of supportive personnel became more complex. The pharmacy clerks and secretaries of the past are now an integral part of most hospital pharmacy personnel pools. The role of many of these key individuals has developed into one of performing nonjudgmental technical functions involved in the processing of medication orders, which include the filling of unit-dose patient drawers or the admixing of intravenous preparations.

The use of the venous system for drug delivery has increased dramatically over the past two decades. This expansion has placed a greater emphasis on IV admixture systems. The IV manufacturers have moved from glass bottles to plastic bags. Along the way, the development of premixed medications, valved intravenous tubing, and intravenous flow control devices have added to the drug delivery options. The need for an aseptic compounding area, the continued responsibility for adequate labeling, and the interpretation of admixture incompatibilities has fallen, appropriately, under the pharmacist's scope of responsibility. Also, the development of parenteral nutrition as a form of intravenous nutritional therapy has become a major role assumed by the hospital pharmacy practitioner. An initially complex compounding function has developed into a patient care monitoring function as well as one of general nutritional assessment. Many have seen this as an avenue to the delivery of intravenous products in the home health care setting.

Computerization

These delivery systems, although important, have not had as dramatic an impact on hospital pharmacy as the computer. Increased availability of electronic data processing has had a profound effect on all areas of society. The original home-programmed computerized labelers have developed into multifaceted systems for unit-dose drug distribution, procurement and inventory control, and management of the complex world of today's hospital pharmacy.

Drug distribution functions that formerly required handwritten documents, such as patient profiles, are now generated by quick key-stroke entries. The patient profile data entered into a computer are automatically screened for duplication and potential drug interaction. Labels are generated with accurate, detailed, preprogrammed directions. At the same time, a patient's billing transaction occurs, and inventory is automatically reduced. The list of drugs to be sent to the patient's medication drawer is automatically generated, and a new addition to the nursing medication administration record is entered. All of these functions are only a small part of the increased productivity of the pharmacy department, made possible by the use of computers. In the middle of all these electronic synapses, patient care has been improved through electronic accuracy.

Purchase orders can be automatically generated by the computer by means of preset recognition of maximum and minimum stocking levels for a particular drug. From the management perspective, detailed analysis of clinical, financial, and productivity data can now be accomplished in a fraction of the time formerly required. This increased productivity has resulted in decreased manpower needs for drug distribution and has increased the availability of pharmacy staff personnel to provide new and innovative services.

Challenges Today

With the current emphasis on cost control, it would seem that hospital pharmacy leaders will need to cost-justify many services that in the past were accepted as major contributions to improved patient care. In addition, with the increased ownership of hospital operations by large private corporations, hospital pharmacy directors will be called upon to demonstrate the ability of pharmacists to make many effective management decisions.

Other challenges facing hospitals focus around competing with new medical and pharmaceutical delivery systems that are earning revenue which otherwise would go to hospitals. Such systems include HMO's, freestanding emergency centers, outpatient surgical centers, and preferred provider organizations.

HMO's are a rapidly growing segment of the health care industry. Current estimates of the number of HMO subscribers are around 14 million, and that number is predicted to double by 1990.[2] Since the primary focus of HMO's is on promoting preventive health care, a successful HMO is one that is able to reduce hospital use in its population. A number of hospitals are seriously considering some type of HMO sponsorship. One advantage a hospital would derive from owning and operating its own HMO is that it would have a revenue source not dependent solely on acute inpatient care. A similar arrangement is one in which two or more hospitals combine to form a network with two or more physician groups to operate their own HMO. Regardless of the approach taken, hospitals no longer can avoid the fact that HMO's are here to stay.

Freestanding emergency centers (FEC's) offer a convenient, low-cost alternative to hospital emergency departments as well as physician offices. A true FEC is open 24 hours a day, seven days a week, and is designed, organized, equipped, and staffed to provide primary episodic care and has the capability to treat life-threatening illnesses or injuries.[3] FEC treatment charges are as much as 35 to 50 percent less than charges for comparable care provided

by a hospital emergency department. It appears that FEC's will cause hospitals to reexamine the ways they now offer emergency services, and factors such as cost and convenience must be given higher priority than in the past, when hospitals were the only place where the public could go for emergency care.

It has been estimated that by 1990 about 40 percent of all surgical procedures performed in this country will be done in outpatient or ambulatory surgery centers[4]. Patients like this alternative to hospital inpatient surgery because of the convenience and pleasant atmosphere, and physicians like its efficiency and the revenue-producing opportunities it presents to them. Hospital spokesmen have criticized the lack of emergency backup services in many of these centers, but the fact remains that some health insurers offer incentives for certain types of surgical procedures to be performed in these centers. As with the HMO market, some hospitals are responding to the competition by entering the outpatient surgery market themselves.

Preferred provider organizations, commonly referred to as PPO's, are characterized by having a limited panel of providers, a negotiated fee schedule, economic incentives to patients (which usually are in the form of provider discounts), and strict controls on utilization and claims review. Also important from a financial management perspective is that PPO's generate a very efficient cash flow. Discounts awarded to patients typically range from 10 to 20 percent less than the usual and customary charges. Providers are attracted to PPO arrangements because of the assured patient volume. Hospitals with unused beds are interested for the same reason. Currently, PPO's are being tested in the courts to determine whether they violate the antitrust laws, but the future certainly looks bright for their continued growth, largely because the business community appears to be very supportive of them.

Cost-Effectiveness of Pharmacy Services

As Diagnosis Related Groups, more commonly referred to as DRG's, and forces emanating from the private sector and other third-party payors have taken their place in health care institutions across the country, hospital administrators have had to focus more of their attention on cost-control measures. In view of these new budgetary constraints, hospital pharmacy practice is facing the task of minimizing costs, not only in the pharmacy department but throughout the hospital, by assessing medications in terms of their ability to cure patients quickly and with few relapses or failures. This broad thinking is leading to a new strategy of utilizing medications that have the ability to decrease lengths of stay or otherwise reduce the patient's overall health care bill. Hospital administrators, particularly in the corporate-run profit institutions, are concerned with the overall utilization of hospital resources and not just expenditures within the pharmacy department.

With the almost single-minded attention being given to the phenomenon loosely referred to as cost-effectiveness, it is important for pharmacy directors to make sure their hospital administrators do not equate "cost-effective" with "least expensive". It is the overall effectiveness of drug therapy that is to be measured, not merely the comparison of acquisition costs between drug entities. In fact, the challenge facing the pharmaceutical industry today is to market drug products that provide the most benefits to the patient in relation to the total health care expenditures that the patient would incur if those drug products were unavailable.

Corporate vs. Professional Control

The trend for large private corporations to acquire and manage hospitals of all sizes has been documented in business literature[5]. This phenomenon has created concern within the pharmacy profession about whether business or professional interests will be the basis for deciding how hospital pharmacies will be run. In a recent editorial, Zellmer questioned the ability of pharmacy to control its destiny in the corporate world of health care[6]. Liaisons with health care administrators, development of minimum standards of practice, and a strong organizational identity are some suggestions given to help pharmacy maintain control of its own operations.

However, just as concern is raised over business interests taking over hospital pharmacy operations, community pharmacists are concerned about hospital pharmacists' growing interest in operating their own retail businesses. Outpatient pharmacy services in many hospitals are evolving by expansion into the local community through innovative programs such as home health care. This competition is not being welcomed by retail pharmacists, even though the question of the right of hospitals to use institutional pricing advantages in the retail marketplace was held illegal in the Portland Decision. HMO's, however, were later exempted from this action, and, therefore, pharmacists perceive them as strong competition.

Optimism through the 1980's

Despite the current emphasis on cost control, hospital pharmacy can expect to succeed during the remainder of the 1980's. Pharmacy directors should be able to continue the development of pharmacy services that are provided by highly trained clinical practitioners, but only if these services reduce overall costs incurred by the institution, particularly in terms of earlier patient discharge without relapse. This is the challenge to hospital pharmacy in the eighties!

*Kenneth W. Kirk, Ph.D., is Professor of Pharmacy Administration and Associate Dean of the College of Pharmacy at the University of Texas in Austin.
†James E. Smeeding, R.Ph., is Director of Pharmacy Services at Brackenridge Hospital, Austin, Texas, and Clinical Assistant Professor at the College of Pharmacy, the University of Texas in Austin.

1. ASHP Guidelines: Minimum Standard for Pharmacies in Institutions, Am. J. Hosp. Pharm., *42*:372, 1985.
2. Coddington, D.C., Palmquist, L.E., and Trollinger, W.V.: Strategies for Survival in the Hospital Industry, Harvard Business Review, p. 132, May-June, 1985.
3. Size of FEC Market a Matter of Opinion, Hospitals, 59:43, May, 1985.
4. Shannon, K.: Outpatient Surgery Up 77 Percent: Data, Hospitals, 59:54, May, 1985.
5. The Fever Hits Health Care, Business Week, p. 41, April 15, 1985.
6. Zellmer, W.: Can Pharmacy Control Its Destiny? Am. J. Hosp. Pharm., *42*:69, 1985.

INVENTORY AND PURCHASES

Average inventory and purchases figures for pharmacies in general and specialized hospitals are shown in Table 2. As hospitals increase in size, average inventory and purchases advance dollarwise. A comparison of 1983 data with this year's figures reveals that inventory and purchases were higher for general hospitals regardless of size. It is interesting to note that a review of specialized hospital data indicates that, although purchases were higher, inventory investment was lower within most bed ranges. This may be explained in part by the implementation of more stringent inventory control procedures within these institutions.

Specialized institutions have higher inventory and purchases values than general hospitals of similar size. This is probably the result of the pharmacy department's expanded role in support of the somewhat sophisticated kinds of services offered by these hospitals. The estimated inventory turnover ratio in both general and specialized hospitals tends to rise as bed capacity increases. Specialized facilities generally post higher inventory turnover ratios in comparison with similar-sized general hospitals. Virtually all general and specialized institutions reported higher inventory turnover ratios for 1984 than for 1983, which suggests continued improvement in inventory control. Most specialized hospitals reporting to the SURVEY were in the large bed ranges; therefore, many of the tables that follow do not contain statistics for the lower bed ranges.

Annual-patient-day information is also tabulated in Tables 2 and 3. It is not surprising that, as hospitals become larger, the number of annual patient days rises. However, inventory-per-annual-patient-day figures in general hospitals tend to decline with increasing size. Table 2 shows that purchases per annual patient day, on the other hand, tend to be relatively constant in general hospitals except in the highest and lowest ranges. Inventory per annual patient day in specialized hospitals also tends to decline as bed size increases; however, purchases per annual patient day increase as bed capacity rises. When compared with similar data for 1983, inventory and purchases per annual patient day were higher for 1984 across all bed ranges regardless of hospital profile.

Table 3 reflects average inventory and purchases statistics that include IV fluids, irrigation solutions, and blood fractions. As expected, hospital pharmacies whose inventory includes these items tend to have higher inventory and purchases figures. These hospitals also report higher inventory and purchases per annual patient day when compared with the total sample, regardless of size or profile.

SURVEY data show that inventory and purchases figures are higher in both general and specialized hospitals of all sizes

Table 2 *Pharmacy inventory and purchases*

General

Bed Capacity	Inventory	Purchases	Inventory Turnover Ratio*	Annual Patient Days	Inventory per Annual Patient Day	Purchases per Annual Patient Day
Under 50	$ 25,344	$ 115,320	4.3	6,076	$4.17	$18.98
50-99	39,724	206,948	5.2	14,652	2.71	14.12
100-199	70,867	464,600	6.6	31,711	2.23	14.65
200-299	114,831	810,512	7.1	60,282	1.91	13.45
300-399	155,695	1,210,647	7.8	87,200	1.79	13.88
400-499	207,694	1,724,423	8.3	115,015	1.81	14.99
Over 499	311,756	2,892,233	9.3	163,594	1.91	17.68

Specialized

Bed Capacity	Inventory	Purchases	Inventory Turnover Ratio*	Annual Patient Days	Inventory per Annual Patient Day	Purchases per Annual Patient Day
Under 50	n/a	n/a	n/a	n/a	n/a	n/a
50-99	n/a	n/a	n/a	n/a	n/a	n/a
100-199	$ 99,366	$ 670,715	6.7	39,250	$2.53	$17.09
200-299	133,488	1,015,942	7.6	59,277	2.25	17.14
300-399	176,324	1,605,836	9.1	88,415	1.99	18.16
400-499	241,809	2,226,138	9.2	117,180	2.06	19.00
Over 499	434,889	3,859,932	8.9	191,254	2.27	20.18

*Estimated inventory turnover ratio = $\frac{\text{Yearly purchases at cost}}{\text{Average inventory at cost}}$

when medical school faculty is part of their staff. This is probably the result of the expanded drug formulary that may be required when future physicians are enrolled in various learning experiences in the hospital setting. The impact of having medical school faculty on staff is most evident in both general and specialized hospitals with more than 300 beds. These larger-sized general hospitals had inventory and purchases figures about 17 percent greater than the overall sample. Specialized hospitals having between 300 and 500 beds with medical faculty on staff recorded inventory and purchases figures about 20 percent higher than those without such faculty.

Almost 42 percent of SURVEY respondents indicated that items such as radiographic agents, anesthetic fluids, hyperalimentation materials, and special diet products were included in their inventory and purchases figures. When SURVEY inventory and purchases figures are used for comparative analysis, they should be increased somewhat to compensate for these more costly items if they are part of normal pharmacy department stock.

The following tabulation lists the percentage of pharmaceuticals and related items purchased through wholesalers by hospital pharmacies, according to bed capacity, for operating years 1984 and 1983:

Wholesaler Purchases (%)

Bed Capacity	1984 (1905 Hospitals)	1983 (2017 Hospitals)
Under 50	73%	65%
50-99	75%	65%
100-199	71%	62%
200-299	65%	55%
300-399	59%	53%
400-499	58%	47%
Over 499	45%	37%
Total	66%	57%

Overall, 66 percent of pharmaceutical purchases by hospital pharmacies were made through the wholesaler during 1984. The data indicate that, as hospitals increase in size, the percentage of purchases from wholesalers decreases. It is interesting to note that the percentage of pharmaceutical purchases through wholesalers increased across all bed ranges during 1984. This increased use of wholesalers as providers of the pharmaceutical materials necessary to maintain adequate patient service is most likely responsible for the remarkable gains in inventory turnover and the resulting favorable impact on cash flow. Goods bought from wholesalers during 1984 by both general and specialized hospitals with fewer than 200 beds exceeded 70 percent of total pharmaceutical purchases, whereas institutions having between 200 and 500 beds obtained about 60 percent of their drugs and related items from wholesalers.

Table 3 *Pharmacy inventory and purchases that include IV fluids, irrigation solutions, and blood fractions*

General

Bed Capacity	Inventory	Purchases	Inventory Turnover Ratio*	Annual Patient Days	Inventory per Annual Patient Day	Purchases per Annual Patient Day
Under 50	n/a	n/a	n/a	n/a	n/a	n/a
50-99	$ 45,972	$ 247,770	5.4	13,958	$3.29	$17.75
100-199	79,377	604,878	7.6	32,581	2.44	18.57
200-299	142,523	964,659	6.8	56,270	2.53	17.14
300-399	161,757	1,469,620	9.1	85,701	1.89	17.15
400-499	n/a	n/a	n/a	n/a	n/a	n/a
Over 499	n/a	n/a	n/a	n/a	n/a	n/a

Specialized

Bed Capacity	Inventory	Purchases	Inventory Turnover Ratio*	Annual Patient Days	Inventory per Annual Patient Day	Purchases per Annual Patient Day
Under 50	n/a	n/a	n/a	n/a	n/a	n/a
50-99	n/a	n/a	n/a	n/a	n/a	n/a
100-199	n/a	n/a	n/a	n/a	n/a	n/a
200-299	n/a	n/a	n/a	n/a	n/a	n/a
300-399	$203,430	$1,971,802	9.7	89,353	$2.28	$22.07
400-499	242,540	2,399,733	9.9	112,487	2.16	21.33
Over 499	529,608	4,563,035	8.6	194,165	2.73	23.50

*Estimated inventory turnover ratio = $\frac{\text{Yearly purchases at cost}}{\text{Average inventory at cost}}$

SURVEY data show that profit hospitals order 81 percent of their pharmacy goods through a wholesaler—an increase of 12 percent from the previous year. Private, nonprofit institutions buy 68 percent of their pharmacy merchandise from wholesalers (up from 59 percent reported for 1983). Government hospitals purchase 60 percent of their pharmacy stock from wholesalers—7 percent more than last year, whereas federal facilities obtain just 7 percent from wholesalers—the same percentage as in the preceding year.

Selected operating figures for two groups of large (more than 500 beds) specialized hospitals were compared to evaluate the influence of wholesaler purchasing on their annual inventory turnover rate (Table 4). These figures cover the two-year period 1984 and 1983. Institutions purchasing between 20 percent and 39 percent (Group I) of their pharmaceutical needs from wholesalers reported a higher figure for inventory and purchases for 1984 than for 1983; however, average inventory in the 1984 group increased at a greater rate than purchases, resulting in a reduction in the inventory turnover rate one full turn (from 8.2 times to 7.2 times). On the other hand, hospitals that bought more than 39 percent (Group II) of their drug and related items from wholesalers showed no change in inventory investment for the two-year period, even though purchases increased during the year. The result was that the inventory turnover rate for this wholesaler-oriented group of hospitals was the highest, at 9.8 times per year. Pharmacies in this group also recorded significantly lower figures for inventory and purchases than those in Group I.

Table 4 shows that the median wholesaler purchase percentage increased from 60 to 75 in the "wholesaler-oriented" hospitals over the two-year period. This increased reliance on wholesaler distribution suggests that large specialized institutions find the cash flow benefits of rapid stock turnover to be valuable.

A total of 1798 (92 percent) hospital pharmacies that contributed data to the SURVEY are affiliated with a cooperative purchasing group. Among general hospital pharmacies, over 95 percent said they held membership in cooperative buying organizations, and almost 91 percent of specialized institutions indicated a similar association. SURVEY data show that almost 81 percent of cooperative members purchase more than one-half of their drug-related needs through cooperatives. Over 98 percent buy pharmaceuticals, and about 73 percent obtain IV fluids and related accessories through these buying groups. Nonpharmaceutical items represent about 9 percent of the pharmacy volume bought through a purchasing group. Only 163 (9.7 percent) buying-group-affiliated hospital pharmacies indicated that their inventory was held and delivered by the purchasing organization (down from 10.2 percent last year).

Hospitals reporting to the 1985 SURVEY that indicated cooperative-buying-group membership are geographically distributed as follows:

New England Region	95.6%
West North Central Region	94.2%
East North Central Region	93.1%
East South Central Region	92.6%
Pacific Region	92.3%
Mountain Region	92.3%
South Atlantic Region	89.8%
Middle Atlantic Region	89.7%
West South Central Region	89.6%

Table 4 *Impact of wholesaler purchasing on inventory turnover in similar groups of large specialized hospitals*

	1984 Wholesaler Purchases (%)		1983 Wholesaler Purchases (%)	
	Group I	**Group II**	**Group I**	**Group II**
	20-39%	**over 39%**	**20-39%**	**over 39%**
Median	30%	75%	30%	60%
Inventory	$ 582,801	$ 348,640	$ 498,771	$ 349,550
Purchases	4,212,006	3,431,817	4,113,596	2,998,015
Turnover rate	7.2 times	9.8 times	8.2 times	8.6 times

PHARMACY STAFF COMPENSATION

Table 5 lists average pharmacist, technician, and support personnel hours worked per week as well as annual payroll, according to bed size and hospital profile. A calculation of the pharmacist and technician hourly payroll figures yields a number useful for overall comparison and trend analysis. It should be noted that all these hourly figures are composite values and therefore not useful as a guideline for actual salaries. This is especially true for pharmacists, since the range between starting staff interns and the director is substantial. In general hospitals, the pharmacist hourly rate appears to fluctuate across most bed ranges, whereas technician hourly pay is relatively constant in hospitals having over 100 beds. Pharmacist and technician hourly payroll in specialized institutions with more than 200 beds also seems to fluctuate, but in a relatively narrow range. The pharmacist hourly wage figure tends to be in the $15 range for both general and specialized hospitals with over 100 beds. Overall, pharmacist hourly pay is higher in specialized hospitals at each bed level as compared with that for general facilities. The technician hourly wage figure appears to be in the $7 range for hospitals with more than 100 beds, regardless of profile. The hourly rate for technicians is also higher in specialized institutions when compared with similar-sized general hospitals. Support personnel hours may be influenced by the volunteer work force present in many hospitals; therefore, any evaluation of these hours and payroll figures should take this factor into consideration.

The SURVEY data show that pharmacists are employed about 1.9 hours per week per occupied bed, whereas the rate for technicians is calculated to be 1.7. These figures are higher than those reported last year (up from 1.7 and 1.5 respectively).

Only 3.8 percent of all SURVEY participants received some type of outside funding for a portion of pharmacist hours. These funds came from sources such as grants and/or stipends. Those reporting such information said that about 65 percent of pharmacist hours funded in this manner were dedicated to clinical practice. It is interesting to note that external funding for pharmacist hours occurred in about 14 percent of hospitals having over 500 beds. This funding accounted for almost 12 percent of total pharmacist hours worked per week in these institutions. SURVEY respondents indicated that close to two-thirds of these hours were allocated to clinical practice.

Table 5 *Pharmacy personnel hours and payroll*

General

Bed Capacity	Pharmacist Hours/Week	Annual Pharmacist Payroll	Technician Hours/Week	Annual Technician Payroll	Support Personnel Hours/Week	Annual Support Personnel Payroll	Total Annual Payroll
Under 50	47	$ 35,819	51	$ 15,677	34	$ 8,391	$ 59,887
50-99	81	61,525	80	24,924	40	12,597	99,046
100-199	160	124,990	132	45,742	51	16,672	187,404
200-299	265	205,044	227	78,596	74	23,712	307,352
300-399	387	315,359	317	115,794	104	35,874	467,027
400-499	545	431,448	478	166,735	148	54,732	652,915
Over 499	739	559,916	627	229,799	195	66,879	856,594

Specialized

Bed Capacity	Pharmacist Hours/Week	Annual Pharmacist Payroll	Technician Hours/Week	Annual Technician Payroll	Support Personnel Hours/Week	Annual Support Personnel Payroll	Total Annual Payroll
Under 50	n/a	n/a	n/a	n/a	n/a	n/a	n/a
50-99	n/a	n/a	n/a	n/a	n/a	n/a	n/a
100-199	238	$202,436	185	$ 76,487	68	$ 17,902	$ 296,825
200-299	337	254,576	261	94,051	86	31,541	380,168
300-399	499	414,362	387	152,952	124	42,834	610,148
400-499	676	536,638	594	212,255	177	60,493	809,386
Over 499	1143	859,799	946	348,298	309	117,122	1,325,219

GEOGRAPHIC SUMMARY

A tabulation of selected operating data arranged according to geographic region is presented in Table 6. For the ninth consecutive year, the Middle Atlantic States reported the highest average bed capacity and census figures. A possible explanation is that more psychiatric, rehabilitation, and long-term-care facilities are located in this region; and, generally, they are larger in size and their patients tend to have longer hospital stays. The West South Central States had the highest inventory and purchases per occupied bed, and the Middle Atlantic States recorded the lowest. Hospital pharmacies in the Middle Atlantic Region occupy the largest space, whereas pharmacy departments in the West North Central States occupy the smallest space. Hospital pharmacies remained open the greatest number of hours in the East North Central States, whereas they are open the fewest hours in the New England Region. Since the East North Central Region reported the most pharmacy hours open, it is not surprising that they also recorded the highest number of pharmacist, technician, and support personnel hours worked per week. Mountain States posted the fewest pharmacy staff hours. In comparison with last year's data, it is interesting to note that census figures declined substantially in all regions, whereas inventory investment grew in seven of the nine regions, and purchases were higher in all except one. In addition, SURVEY respondents in the four regions west of the Mississippi River reported a census of less than 60 percent for the first time in SURVEY history.

Table 6 *Geographic summary of selected operating data*

Region	Bed Capacity	Inventory	Purchases	Pharmacy Floor Area (sq ft)	Percent of Census	Pharmacy Hours Open	Pharmacist Hours/ Week	Technician Hours/ Week	Support Hours/ Week	Number of Hospitals Reporting
New England States CT, MA, ME, NH, RI, VT	232	$138,547	$ 870,317	1787	72%	86	282	254	119	114
Middle Atlantic States NJ, NY, PA	322	142,049	1,029,163	1986	78%	88	297	211	95	262
East North Central States IL, IN, MI, OH, WI	261	129,433	1,015,052	1950	63%	105	331	321	124	424
West North Central States IA, KS, MN, MO, ND, NE, SD	190	94,055	696,762	1362	54%	88	229	193	86	242
South Atlantic States DC, DE, FL, GA, MD, NC, SC, VA, WV	265	128,366	1,053,594	1878	66%	100	301	306	114	268
East South Central States AL, KY, MS, TN	244	113,094	929,448	1842	65%	99	270	257	99	137
West South Central States AR, LA, OK, TX	212	128,610	1,035,487	1413	55%	99	273	235	119	185
Mountain States AZ, CO, ID, MT, NV, NM, UT, WY	169	87,509	633,006	1569	59%	92	233	142	70	104
Pacific States AK, CA, HA, OR, WA	225	110,383	985,556	1549	59%	103	308	286	117	221
United States Average	**245**	**121,414**	**944,569**	**1734**	**63%**	**97**	**290**	**260**	**109**	—

PHARMACY SERVICES

Chart 1 reports hospital pharmacy services offered on a daily basis, ranked according to the percentage of total mentions in the sample. The ranking for 1984 was the same as that reported for 1983. It is interesting to note that, for the first time in SURVEY history, there appeared to be a slight reduction in the "scope" of pharmacy services offered as evidenced by the decline in the percentage figures for seven of the ten services polled. This apparent reversal of a long-term uptrend seen for the past several years will be closely monitored for several years before conclusions can be drawn about the scale of pharmacy services. However, one notable exception to this is pharmacokinetic service. This patient service increased more than 19 percent among participating hospitals during 1984 and has increased more than fourfold since 1978 (from 6.2 to 27.7 percent).

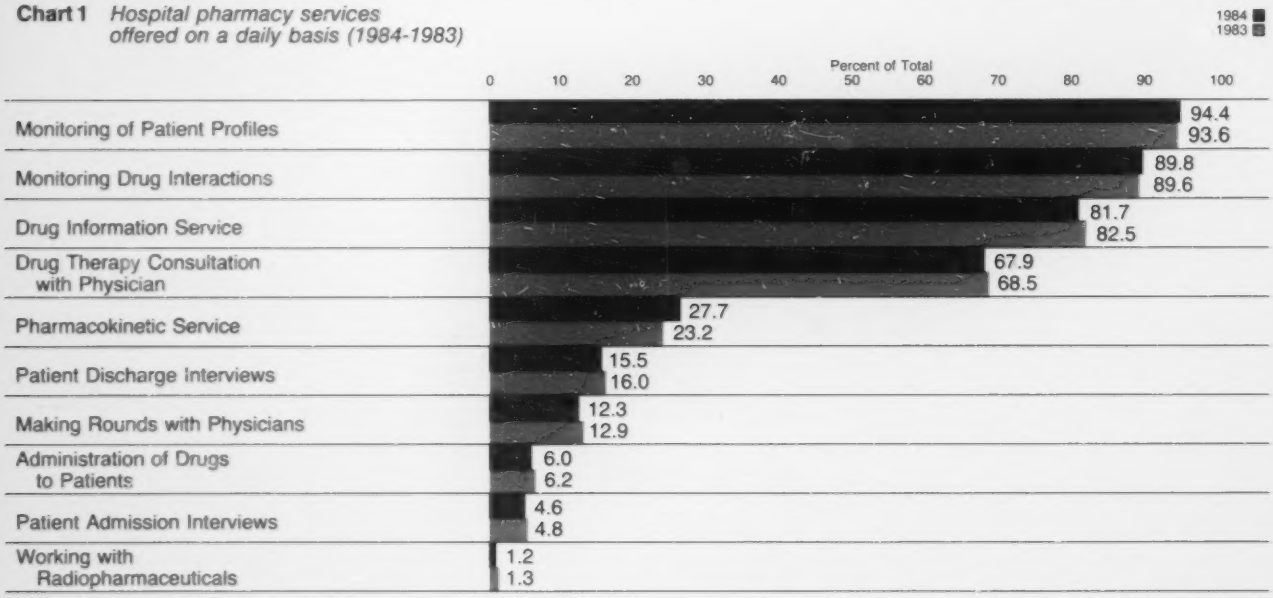
Hospital pharmacy directors were asked whether specific pharmacy services were routinely part of their departmental responsibility. The percentages of general and specialized hospitals offering these services are tabulated below.

Review of these data shows that the percentage of hospitals offering these services is very similar for both general and specialized hospitals. In a comparison with similar statistics from a year earlier, it is interesting to note that drug utilization review moved into the top ranking for specialized hospitals. This service appears to have expanded substantially in scope among specialized hospitals during 1984, whereas in-service education declined.

Drug utilization review and responding to CPR attempts were reported by a greater percentage of general hospitals during 1984 than in 1983. Publication of a regular pharmacy bulletin and training programs for students continue to be more often associated with specialized hospitals than with general institutions.

	Percent of Total	
Service Available	**General**	**Specialized**
Drug utilization review	88.0%	90.6%
In-service education	86.4%	87.5%
Regular pharmacy bulletin	62.5%	82.9%
Training program for students	52.1%	73.5%
Responding to CPR attempts	33.0%	28.6%

Chart 1 *Hospital pharmacy services offered on a daily basis (1984-1983)*



PHARMACY OPERATIONS MANAGEMENT

Table 7 presents selected operating statistics from both general and specialized hospitals arranged according to bed size. The emphasis is on operating figures specific to pharmacy department personnel and the drug distribution tasks they perform, which pharmacy managers have indicated would be useful for purposes of comparison.

The average bed capacity for both general and specialized institutions falls about mid-range within each bed group. Annual census, central pharmacy hours open per week, and length-of-patient-stay figures tend to increase as bed capacity rises, regardless of profile. It is understandable that length of patient stay advances as bed size increases, since larger hospitals tend to have more sophisticated facilities and, therefore, treat the more acutely ill patient. It is interesting to note that length of patient stay appears to be quite similar in both general and specialized hospitals, regardless of size.

Pharmacist hours worked per week per occupied bed remain relatively constant in general and specialized facilities of more than 200 beds. However, the figure is higher in specialized hospitals across all bed ranges than in general hospitals of similar size. This may be explained in part by the expanded patient services offered by specialized institutions. Technician hours worked per week per occupied bed present a somewhat different picture. In general hospitals, the technician ratio tends to decline as bed capacity moves upward, whereas in specialized facilities this ratio appears to fluctuate in a relatively narrow range across most bed groupings. Similar to the pharmacist ratio, technician hours worked per week per occupied bed were higher in specialized hospitals than in general institutions of the same size. Pharmacy staff annual payroll per occupied bed declined steadily in general hospitals until bed capacity reached 300. At this point, the pharmacy staff payroll ratio tended to stabilize at about $1900. On the other hand, the payroll ratio for specialized facilities having more than 300 beds stabilized at a substantially higher level—close to $2400. This higher ratio among specialized hospitals may be the result of more pharmacy services being provided by these institutions, which, in turn, increase the demand for additional pharmacy staff personnel.

The average inventory per occupied bed declines as bed size increases in general hospitals. In specialized facilities, this statistic tends to move lower until bed capacity reaches more than 400; then, inventory per occupied bed begins an upward trend. The inventory ratio in specialized hospitals is higher than that of similar-sized general facilities. Purchases per occupied bed in general hospitals having over 50 beds tend to be relatively constant at about $5000, regardless of size. Specialized institutions having between 200 and 500 beds have a purchases-per-occupied bed figure

Table 7 *Operations management*

General

Operating Statistics	Bed Capacity						
	Under 50	50-99	100-199	200-299	300-399	400-499	Over 499
Average bed capacity	36	73	141	240	337	438	535
Census	45%	56%	63%	69%	71%	72%	71%
Pharmacy hours open per week	45	64	89	107	133	143	149
Length of patient stay	4.7	5.3	6.1	6.7	6.9	7.1	7.0
Pharmacist hours per week*	3.0	2.1	1.8	1.6	1.6	1.6	1.6
Technician hours per week*	2.7	1.7	1.5	1.3	1.3	1.4	1.4
Pharmacy staff annual payroll*	$3697	$2417	$2139	$1858	$1921	$1937	$1898
Average inventory*	$1434	$ 936	$ 794	$ 676	$ 632	$ 627	$ 594
Purchases*	$5755	$5065	$5187	$4918	$4924	$4984	$5023
Nonparenteral orders per week*	99	81	83	82	74	93	84
Parenteral orders per week*	15	11	9	9	8	9	7
Central pharmacy floor area (sq ft)	306	725	1233	1854	2368	3186	3190

*All figures calculated on basis of occupied beds.

that approximates $6300. The largest specialized facilities post an average purchases ratio of about $7000. The calculated inventory turnover figure for general hospitals shows an upward trend from 4.0 inventory turns per year in the lowest bed range to 8.5 in the highest. Inventory turnover figures tend to be higher in specialized facilities than in general hospitals, and they range from 6.6 times per year in the smaller-sized hospitals to 9.3 in those with 400 to 500 beds. It is interesting to note that the inventory turnover rate declined in specialized hospitals having more than 500 beds. SURVEY data show that over 90 percent of these specialized institutions offer intern/resident training programs. As mentioned earlier, hospitals offering these programs tend to have higher inventory figures that result from expanded drug formularies.

In general hospitals, nonparenteral medication order activity per week per occupied bed tends to vary as bed size rises (nonparenteral medication includes outpatient multidose prescriptions dispensed). However, parenteral medication order activity per week per occupied bed appears to decline as hospitals become larger (parenteral medication includes such items as hyperalimentation preparations, irrigation solutions, large and small-volume IV admixtures, and reconstitutions). Among specialized institutions, these two medication order activity ratios tend to remain relatively constant as bed capacity rises.

An interesting number for comparison can be derived by dividing the sum of the medication order activity figures by the sum of the figures for pharmacist and technician hours worked per week per occupied bed. The figure that results from this calculation indicates the number of medication orders processed per pharmacy staff hour worked. It is interesting to note that when these calculations are performed for both general and specialized hospitals in the 300 to 400-bed range, the resulting numbers are quite similar (28 and 29 respectively), which suggests that drug distribution productivity by the pharmacy staff is about equal in both types of institutions. The medication order activity/pharmacy staff hours worked ratio in general hospitals tends to increase from 20 in the lowest bed range to over 30 at the higher end of the grouping. In specialized institutions with 100 to 400 beds, the ratio appears to increase somewhat; but in those hospitals with more than 400 beds, the medication order activity/pharmacy staff hours worked ratio remains constant. Since this ratio fluctuates in such a narrow range among specialized facilities, the average value of 27 may be used for comparative purposes.

Specialized

Operating Statistics	Bed Capacity						
	Under 50	50-99	100-199	200-299	300-399	400-499	Over 499
Average bed capacity	n/a	n/a	170	243	344	440	683
Census	n/a	n/a	67%	68%	71%	74%	75%
Pharmacy hours open per week	n/a	n/a	105	133	147	157	160
Length of patient stay	n/a	n/a	5.9	7.0	6.4	7.3	7.2
Pharmacist hours per week*	n/a	n/a	2.4	2.1	2.0	2.0	2.0
Technician hours per week*	n/a	n/a	1.8	1.6	1.5	1.8	1.7
Pharmacy staff annual payroll*	n/a	n/a	$2910	$2322	$2459	$2386	$2397
Average inventory*	n/a	n/a	$ 906	$ 759	$ 669	$ 683	$ 803
Purchases*	n/a	n/a	$5935	$6330	$6330	$6343	$7085
Nonparenteral orders per week*	n/a	n/a	93	93	90	87	90
Parenteral orders per week*	n/a	n/a	10	9	10	10	8
Central pharmacy floor area (sq ft)	n/a	n/a	1709	1757	2822	3094	4418

*All figures calculated on basis of occupied beds.

PRODUCTIVITY MEASUREMENT

Hospital pharmacy directors agree that a quantitative system which measures the output of the pharmacy staff is invaluable both in terms of their management of the staff and in budget discussions with hospital administration. Staff productivity measurement coupled with the flexible assignment of hours can produce maximum efficiency.

This system is based on six basic work activities. Time values for each were determined through time and motion studies.

Task	Standard Time Value (Minutes)
Unit-Dose Medication Order	2.9
Hyperalimentation Preparation	37.4
Large-Volume IV Admixture with Additive	6.4
Small-Volume IV Admixture with Additive	7.0
Multidose Medication Order (Inpatient and Outpatient)	9.6
Large-Volume IV without Additive	2.9

These standard time values include administrative and management functions, clinical activities, drug dispensing and distribution, meetings, staff consultations with other health care professionals, clerical time, and idle time.

A completed productivity measurement calculation work sheet is shown on page 17 and includes task and time value information under the heading "Pharmacy Work Load." The lower portion of the work sheet headed "Pharmacy Staff Hours" lists the pharmacy staff positions and the main task assigned to each. Using this work sheet, the sample pharmacy department's productivity indicator was calculated. When the productivity indicator is less than one, then pharmacy staff productive hours are greater than the pharmacy work load calls for, which suggests possible overstaffing. A figure approximating one indicates that pharmacy staff hours are in balance with the work load. A productivity indicator greater than one suggests an effective and productive pharmacy staff. In addition to the evaluation of staff hours against an overall standard, it is useful to compare figures with those of other hospitals of similar size and description. This comparison allows a more realistic evaluation of a pharmacy department's productivity. An additional productivity work sheet is included on page 22.

Table 8 lists the productivity indicators for general and specialized hospitals according to bed size. The indicator for the usual average category of general hospitals tends to rise with increasing bed capacity, whereas the ratio for specialized institutions shows a downtrend as hospitals become larger. It is important to note that all indicators are greater than one, which suggests that most pharmacies report staffs that are very efficient in terms of work output.

When pharmacy staff hours are varied by one full-time equivalent (40 hours), the productivity indicator value changes disproportionately as bed capacity rises (Table 8). It is important to note that in these calculations, pharmacy work-load hours are held constant within each bed range, whereas pharmacy staff hours are varied. Therefore, a change of one full-time equivalent results in a much greater variation in the productivity indicator figure in smaller-sized hospitals than in larger hospitals.

Another way that productivity measurement data can be helpful is in the planning process. If the data shown in the sample productivity work sheet are used, the question may be posed: To what extent will pharmacy staff hours be affected if the goal is to improve the productivity indicator figure by 10 percent? Assuming that pharmacy work load remains constant, staff hours must decline 132 hours, or about 3.3 FTEs, to produce a productivity indicator value of 1.65, up 10 percent.

Considerations of this nature must be tempered with a thorough assessment of the implications for the remaining pharmacy staff personnel. A reevaluation of the time dedicated to the various major departmental functions, such as

Table 8 *Productivity indicators*

General

	Under 50	50-99	100-199	200-299	300-399	400-499	Over 499
Less 1 FTE*	1.95	1.80	1.82	1.93	1.80	1.96	n/a
Usual average	1.36	1.44	1.60	1.79	1.71	1.90	n/a
Plus 1 FTE*	1.04	1.20	1.44	1.67	1.63	1.83	n/a

Specialized

	Under 50	50-99	100-199	200-299	300-399	400-499	Over 499
Less 1 FTE*	n/a	n/a	n/a	1.69	1.70	1.54	1.44
Usual average	n/a	n/a	n/a	1.59	1.63	1.50	1.41
Plus 1 FTE*	n/a	n/a	n/a	1.50	1.57	1.46	1.38

*The equivalent of 40 pharmacy staff hours.

drug distribution, administration, and clinical practice, should be undertaken. The responsibility of the pharmacy department in support of the overall mission of the institution must also be examined.

Current hospital pharmacy literature suggests that pharmacy directors are challenged to find ways to contain costs—not only direct savings but the overall efficiencies, especially shorter patient stays, that may accrue as a result of effective pharmacy service and pharmaceuticals. A director of pharmacy services recently stated: "There are so many factors coming to bear on the patient population of our hospitals that traditional methods of budgeting, staffing, and analyzing our departments no longer provide the timely responsiveness that is necessary for the effective management of our resources." Hospital administrators have said that the pharmacy department programs having the best chance of survival are those which are well documented and objectively justified. This section on productivity measurement seems to satisfy both of these requirements.

Pharmacy Work Load

	Standard Time Value (Minutes)	Total W.L.U.	Total Standard Time (Minutes)
Unit Dose	2.9	25,644	74,368
Hyperalimentation	37.4	115	4,301
Large-Volume IV (Add.)	6.4	887	5,677
Small-Volume IV (Add.)	7.0	2,247	15,729
Multidose Prescriptions (IP, OP)	9.6	3,129	30,038
Large-Volume IV (w/o Add.)	2.9	30	87
Total			130,200

Total Standard Work-Load Hours $= \frac{\text{Total Standard Time (Min.)}}{60} = \frac{130{,}200}{60} =$ **2170**

Pharmacy Staff Hours

Pharmacy Staff	Productive Hours
Pharmacist (Drug Distribution)	487
Pharmacist (Management)	105
Pharmacist (Clinical Practice)	84
Technician (Drug Distribution)	594
Support Personnel	177
Total Actual Productive Hours	**1447**

Productivity Indicator $= \frac{\text{Total Standard Work-Load Hours}}{\text{Total Actual Productive Hours}} = \frac{\mathbf{2170}}{\mathbf{1447}} = 1.50$

Operating Trends and Outlook for Hospital Pharmacy

Kenneth W. Kirk, Ph.D.

The results of any trend analysis usually depend on the span of time used to develop the trend line. Nowhere is this more evident than in the hospital pharmacy business, where the institutional environment has undergone dynamic operational changes during the past few years. After years of substantial increases in nearly all categories of hospital data, the following changes that occurred from 1983 to 1984 certainly depict a different environment in which hospital pharmacy directors today must manage their operations.

- The number of pharmacist hours worked per week rose about 3 percent, and the number of technician hours decreased about 1 percent.
- Inventory remained essentially unchanged, although inventory per patient day rose more than 10 percent.
- Purchases increased over 7 percent, but purchases per patient day increased more than 18 percent.
- The average hospital census dropped 6 percentage points.
- Admissions declined 2 percent.
- Average length of stay decreased one-half day.

In looking at current trends occurring in hospital pharmacy, we will focus our attention on aspects of inventory control and personnel. A pharmacy's inventory is the means by which its revenues are generated and costs are contained. It is generally recognized that since about three-fourths of a hospital pharmacy's operating costs are for drug purchases, inventory control is critical for effective management in today's cost-conscious environment.

As with many other areas in the hospital, another major expense category for hospital pharmacies is that of personnel. The continuing evolvement of clinical services certainly has expanded the roles that pharmacists can play throughout the institution. Concurrently, as pharmacists find more and more of their time being spent away from the pharmacy per se, more tasks and responsibilities are being assigned to pharmacy technicians. The debate over the level of training needed by these technicians has lessened somewhat during the 1980's, but the issue is still critical for directors facing economic decisions regarding how personnel dollars should be split between pharmacists and technicians.

Chart 2 *Yearly trend in hospital hours per week*

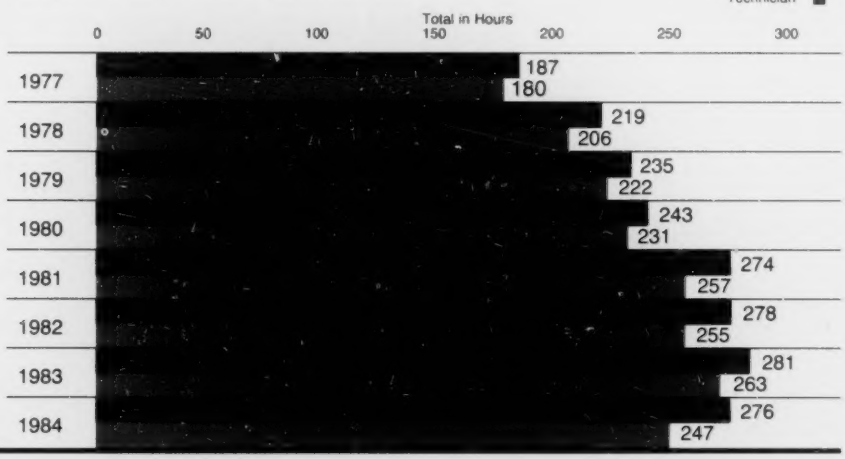
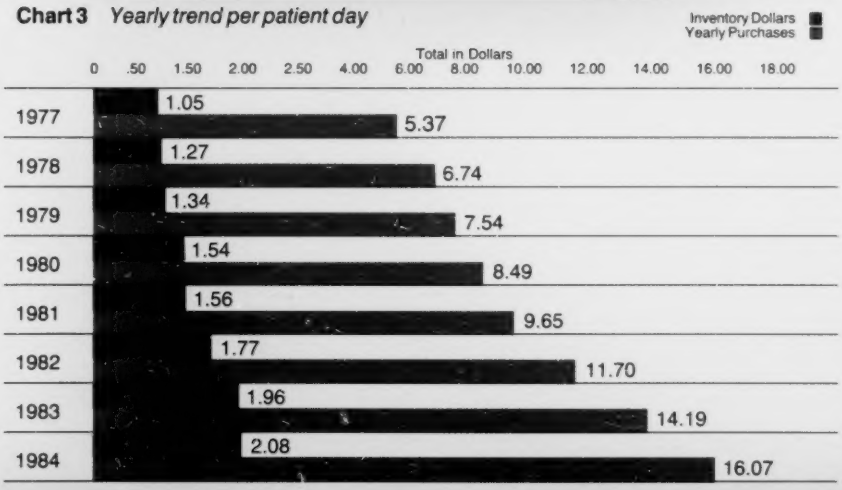


Chart 3 *Yearly trend per patient day*



The four categories in Charts 2 and 3 reveal trend lines for the areas that will be discussed in some detail: (1) pharmacist hours worked per week; (2) technician hours worked per week; (3) pharmacy inventory per patient day; and (4) annual pharmacy purchases per patient day. Projecting figures for 1989 produces different results, depending on the number of years we include in the straight-line trend calculation, a point that is made in our opening sentence.

Two sets of five-year projections appear in Table 9. One set is based on a straight-line trend analysis using data from 1977 through 1984; the other set of projections is based on a straight-line trend analysis using only data from 1981 through 1984. All data are taken from past editions of the LILLY HOSPITAL PHARMACY SURVEY.

During the next five years, the trend line for pharmacist and technician staffing is expected to be similar to that seen over the past four years; therefore, a reasonable forecast would be that, by 1989, pharmacists in the average hospital will be working an average of 314 hours

per week as compared with 270 hours for technicians.

On the other hand, the eight-year trend line might be a better predictor of inventory and purchases levels, as evidenced by the strong trend line seen in the table. Therefore, a reasonable prediction for 1989 would be that inventory levels will be around $160,000, whereas purchases will be in the area of $1.35 million. When viewed on the basis of inventory or purchases per occupied bed or patient day, the forecast is even less certain because of the speculative nature of what hospital occupancy rates will be in five years. However, it would seem reasonable to expect inventory levels to settle somewhere near $1100 per occupied bed and $3.00 per patient day. Purchases in 1989 could be expected to be around $9000 per occupied bed and $25.00 per patient day.

Now that our five-year forecasts have been made, let's look at some of the factors that will affect how accurate these predictions will prove to be. First, though, is a brief discussion of the anticipated personnel needs in 1989 for both pharmacists and technicians.

Pharmacy Manpower Needs

All indications point to a continuing growth in the number of pharmacists needed in tomorrow's hospital, although this growth is not likely to be as great as that seen during the 1970's. DRG's and forces emanating from the private sector and other third-party payors are causing hospitals to take a closer look at the medical necessity of admitting patients who in the past would have been admitted with little question. This is resulting in an increasing level of care being needed by those who are hospitalized, which means that more sophisticated drug therapy is being administered. The value of pharmacists in optimizing the care that patients receive through drug therapy has never been greater.

If the trend toward six-year Pharm.D. programs continues in our nation's colleges of pharmacy, it is assumed that starting salaries will increase commensurate with the increased skills these pharmacists will bring to the hospital marketplace. If that is the case, directors may well be hiring fewer pharmacists and placing additional responsibilities with technicians who are less trained and lower paid. In short, if a significant number of colleges adopt the Pharm.D. as their first degree, our forecasted number of pharmacist hours likely is too high and the number of technicians hours too low. On the other hand, even if colleges follow this trend, the impact likely would not be evident in only five years, so that its effect on our forecast may well be minimal. However, the Pharm.D. issue definitely will have to be considered in forecasts for the decade of the 1990's.

Improving Drug Purchasing

Much of the recent efficiency which many hospital pharmacy directors have developed in drug purchasing is due to group purchasing arrangements and the increasing reliance on drug wholesalers. There was a marked increase in the average hospital pharmacy inventory turnover rate in 1984, caused to a great extent by the trend toward purchasing from drug wholesalers. After all, one of the marketing advantages a wholesaler offers is its ability to improve a pharmacy's inventory turnover rate owing to less inventory having to be kept in stock at any given time. Also, by optimizing the time between order input and delivery, out-of-stock situations are reduced considerably. Maintaining adequate stock levels contributes toward the hospital's goal of reducing the patient's length of stay by always having the right drug available at the right time.

Drug wholesalers and hospital pharmacies have established a strong relationship through what is called the "prime-vendor" concept. This simply means that the hospital makes a commitment to purchase most of its drugs from one drug wholesaler rather than from several sources. Wholesalers have been quick to recognize the value of the prime-vendor concept; in fact, hospital sales now represent the fastest growing segment of the drug wholesale industry's market.

There is little doubt that today's drug wholesaler will continue to place a high priority on marketing its services to hospital pharmacies. This relationship will develop because hospital pharmacies will continue to benefit operationally from the efficiencies that can result from working with wholesalers. For example, wholesalers can provide management reports that describe inventory movement, information that will lead an effective director to increase the pharmacy's inventory turnover rate as well as to increase cash flow for the entire hospital.

Table 9 *1989 projections on selected hospital pharmacy operational data using straight-line trend analysis for years 1977-1984 and 1981-1984*

	1989 Forecast Based on 1977-1984 Trend Line	1989 Forecast Based on 1981-1984 Trend Line
Pharmacist hours/week	371	314
Technician hours/week	356	270
Inventory	$ 159,045	$ 145,550
per occupied bed	1040	1146
per patient day	2.85	3.16
Purchases	$1,336,661	$1,423,097
per occupied bed	8493	10,429
per patient day	23.28	28.58

In addition to these management services, hospital pharmacies are recognizing the tremendous value of wholesaler services, such as computerized shelf labels. Although hospitals have utilized the computer for routine record keeping for many years, hospital pharmacy has rarely benefited by the capability of the computer in identifying and keeping track of inventory as it enters and leaves the pharmacy.

One area of experimentation which may soon occur between innovative drug wholesalers and innovative hospital pharmacies is that of utilizing robotics and computers together to carry out many of the routine tasks associated with drug inventory maintenance and prescription order dispensing. Some of the large retail chain drug operations already are beginning to look at the potential of robotics for improving the efficiency of their prescription department operations. Rest assured, however, that the service components of hospital pharmacy practice will not be carried out by robots, because health care delivery will continue to depend heavily on the "human touch" between patient and health care professional. In fact, as clinical pharmacy services continue to evolve in the hospital setting, pharmacists will become more involved in direct patient management, which will allow them to show overall cost savings to hospital administrators. This cooperative effort within the framework of the "health care team" can only lead to better working relations between pharmacists and other health care personnel.

Are We Pounding Square Pegs into Round Holes?

Without doubt, the current emphasis on cost containment in the hospital industry represents an attempt to make hospitals operate in a more "businesslike" manner, but perhaps it is worth taking a minute to consider the views of Peter Drucker, which he expressed long before hospitals ever thought of trying to contain their costs.

In his book *Management: Tasks, Responsibilities, and Practices,* Drucker has an excellent chapter entitled "Why Service Institutions Do Not Perform." He disputes those who believe that service institutions would perform better if their administrators would behave like businessmen. Drucker says, "This belief is the wrong diagnosis and being businesslike is the wrong prescription for the ills of the service institution." The word "businesslike" is interpreted by service institutions as controlling costs, the mark of efficiency. What should be pursued, however, is control by performance and results, a mark of effectiveness. In short, it is *effectiveness and not efficiency which the service institution lacks,* according to Drucker.

In other words, hospitals that continue to attempt to satisfy every perceived need of their wide range of constituents will continue to be unable to develop meaningful objectives. Without any positive direction from management, performance will continue to be measured by one's ability to maintain or increase one's budget, for such is the nature of any budget-based institution. And the relative standing of one's budget will tend to dictate the "political power" a manager has within the institution.

In summary, Drucker is advising us that hospitals will not become more effective in their mission until the emphasis is on results, not costs. This relates to the point raised previously that a given drug may be more expensive than others, but its overall effectiveness may well warrant that expenditure in terms of the effect on the patient's total health care expenses. Unfortunately, cost containment has too frequently focused on efficiency (reducing drug costs) when attention to overall effectiveness would have truly addressed the problem.

The point of concluding in this manner is to encourage pharmacists to take a moment and think about whether they are caught up in a whirlwind of activity which may not solve the real problems that exist in our health care system. As the old adage goes...when you are up to your elbows in alligators, it's hard to remember that your objective was to drain the swamp. In that light, perhaps it is well to remember that, although everything today seems to revolve around cost containment, these various forms of cost control represent only the "alligators," not the "drain."

COMPARATIVE ANALYSIS WORK SHEET

If you wish to perform your own analysis, this work sheet may be useful.

If your pharmacy's operating data are affected by any of the variables that appear beneath each entry, adjust the comparative figure by consulting the appropriate table listed.

1. Hospital profile
   - General ☐
   - Specialized ☐
   - Other ☐
2. Bed capacity _____
3. Geographic location _____

	Yes	No
4. Unit-dose system	☐	☐
5. IV admixture service	☐	☐

Operating Data	Current Data	Previous Year's Data	Survey Data (Comparable Category)
Inventory* (at cost) for 1984 Use Table 2 for averages and Table 6 to adjust for geographic variation. Refer to Table 3 if inventory includes IV or irrigation solutions or blood fractions.	$_____	$_____	$_____
Purchases* (at cost) for 1984 Use Table 2 for averages and Table 6 to adjust for geographic variation. Refer to Table 3 if purchases include IV or irrigation solutions or blood fractions.	$_____	$_____	$_____
Estimated inventory turnover ratio† Use Table 2 for averages.	_____ times	_____ times	_____ times
Pharmacist hours worked per week Use Table 7 for averages.	_____ hours	_____ hours	_____ hours
Technician hours worked per week Use Table 7 for averages.	_____ hours	_____ hours	_____ hours
Hours main pharmacy open per week Use Table 7 for averages.	_____ hours	_____ hours	_____ hours
Pharmacist payroll Use Table 5 for annual pharmacist payroll.	$_____	$_____	$_____
Pharmacy floor size Use Table 7 for averages.	_____ sq ft	_____ sq ft	_____ sq ft

*Include prescription drugs, IV and irrigation solutions, and blood fractions, if normally in pharmacy's budget.

†Estimated inventory turnover ratio = $\frac{\text{Yearly purchases at cost}}{\text{Average inventory at cost}}$

PRODUCTIVITY WORK SHEET

Pharmacy Work Load

	Standard Time Value (Minutes)	Total W.L.U.	Total Standard Time (Minutes)
Unit Dose	2.9		
Hyperalimentation	37.4		
Large-Volume IV (Add.)	6.4		
Small-Volume IV (Add.)	7.0		
Multidose Prescriptions (IP, OP)	9.6		
Large-Volume IV (w/o Add.)	2.9		
Total			

Total Standard Work-Load Hours = $\frac{\text{Total Standard Time (Min.)}}{60}$ = $\frac{\qquad}{60}$ = _____

Pharmacy Staff Hours

Pharmacy Staff	Productive Hours
Pharmacist (Drug Distribution)	
Pharmacist (Management)	
Pharmacist (Clinical Practice)	
Technician (Drug Distribution)	
Support Personnel	
Total Actual Productive Hours	

Productivity Indicator = $\frac{\text{Total Standard Work-Load Hours}}{\text{Total Actual Productive Hours}}$ = _____ = _____

CONCLUSION

The challenges facing hospital pharmacy management continue to center around such issues as operational efficiency, cost control, and increasing competition within the health care industry.

The implementation of prospective reimbursement (DRG's) has led to a greater awareness of the importance of cost control and its impact not only on hospital pharmacy operations but on the overall institution as well. Increasingly, pharmacists are concerned with the cost-effectiveness of pharmaceuticals in terms of improving patient therapy, thus enabling earlier discharge. One result of this concern is the pharmacy department's reevaluation of its productivity and its effect on other hospital costs associated with patient care.

If the decline in the hospital population continues the trend seen this year, the productivity per man hour of the hospital pharmacy staff can also be expected to decline unless other activities are implemented or pharmacy staff hours are adjusted. Cost containment in hospitals seems to have heightened the interest of administrators in other segments of the health care market, such as HMO's, freestanding emergency care centers, outpatient surgical centers, and even retail pharmacy. The impact of these activities on the expanding health care market is yet to be determined.

Some observers have said that, to sustain the dynamic growth of hospital pharmacy, today's practitioner needs to be increasingly aware of the factors which influence his or her professional environment. The continued expansion of the "business" aspect as well as the clinical phase of hospital pharmacy practice suggests that this may be sound advice.

60-DR-0794 PRINTED IN U.S.A. 500498-98520